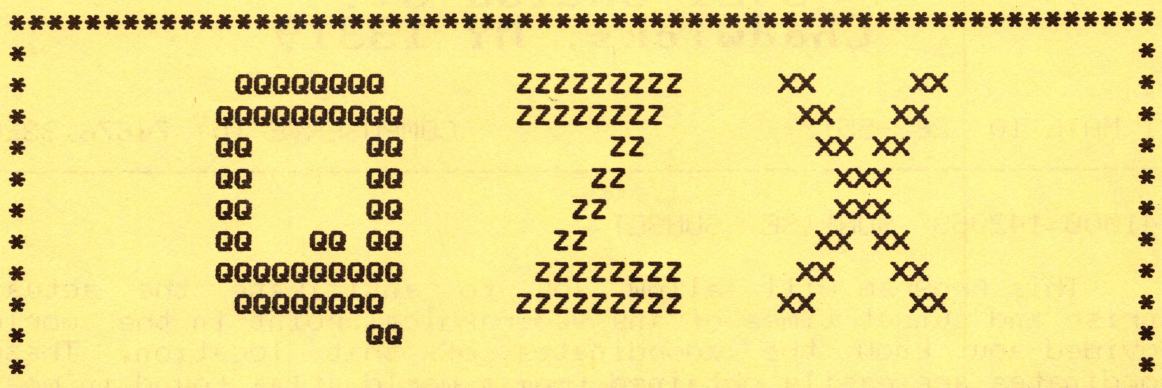

The Journal Covering Amateur Radio & Sinclair Computers
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Alex. F. Burr 88001 Bo Barry
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MERRY CHRISTMAS AND A HAPPY NEW YEAR

THIRD ANNIVERSARY ISSUE
THIRD ANNIVERSARY ISSUE
THIRD ANNIVERSARY ISSUE

KA2LHO HAM HELPER SERIES

Kraig D. Pritts-KA2LHO
3421 Oneida St.
Chadwicks, NY 13319

MCI MAIL ID: 262-5517 COMPUSERVE ID: 74676,3320

#141000/142068 SUNRISE, SUNSET

This Pro9ram will allow you to anticiPate the actual sunrise and sunset times of any 9eo9raPhical Point in the world Provided you know the coordinates of that location. These coordinates are easily obtained from a world atlas found in most Public and school libraries. To run this Pro9ram from taPe use LOAD "SUNRISE" (for 2068 use LOAD "sunrise"). The Pro9ram is self-startin9 and uPon a successful load a title screen will aPPear. If you wish to make any modifications to this Pro9ram, then you should Press BREAK while the title screen is disPlayed. You may then LIST and EDIT the Pro9ram as desired.

After the title screen you will be asked to enter some initial information. First thin9 re9uested will be the month of the date for which you wish the calculations to be made. Enter this as a number (i.e. Jan=1, Feb=2, Mar=3, etc.). You will next be PromPted for the day-also to be entered as a numerical fi9ure. Next, you will be asked for your lon9itude/latitude coordinates (or those of the location for which you desire these calculations). The balance of the initial PromPts deal with location name, number of days for which calculations are desired and if Printer outPut is re9uested. Printer outPut is to the TS 2040 or ZX Printer but can be adaPted to any Printer which reco9nizes the Sinclair Printin9 commands.

From this Point on the Pro9ram runs itsef. An occassional continue PromPt may be needed by Pressin9 ENTER when instructed. One Point to be aware of is that the calculations droP leadin9 zeros. For examPle, the time of 12:1 would be read as twelve hours and one minute, not twelve hours and ten minutes. Trailin9 zeros are included and disPlayed for you.

After comPletion of all calculations, you are 9iven the oPtion of exitin9 the Pro9ram or makin9 another run. The individual user may wish to modify this Pro9ram to allow an oPtion near the be9innin9 of a run to choose from a re9ularly used set of coordinates or to enter a new set each run. Please note that all times are shown in UTC and reflect actual sunrise and sunset times. APParent times for each may be a few minutes different and would re9uire some minor adjustments within the Pro9ram.

Sunrise, Sunset should Prove very useful in the comPuterized hamshack and will be a fine addition to your ham software library.

LISTING FOR SUNRISE, SUNSET

```
==============================
   0 REM (C)1985 KA2LHO HAM HELP
ER SERIES; KRAIG D. PRITTS, 3421
 ONEIDA ST., CHADWICKS, NY  1331
9
    2 LET W$="
                "
    3 GOTO 10
    4 FOR Z=3 TO 21
    5 PRINT AT Z,0;W$
    6 NEXT Z
    7 RETURN
   10 LET B=0
   20 SLOW
   30 GOTO 1200
   80 CLS
   90 PRINT "********************
*************     INITIAL INFORM
ATION      ********************
*************"
   99 PRINT
  100 PRINT "* ENTER STARTING MON
TH AS A NUM-  ERICAL FIGURE-> ";
  102 INPUT M
  103 PRINT M
  104 PRINT ,,"* ENTER STARTING D
AY AS A NUMER-  ICAL FIGURE-> ";
  108 INPUT DA
  109 PRINT DA
  110 GOSUB 4
  115 PRINT AT 4,10;"*** NOTE ***
"
  120 PRINT AT 6,0;"WHEN ENTERING
 COORDINATES, USE AMINUS SIGN (-
) FOR  DEGREES OF  EAST LONGITUD
ES AND SOUTH LATI- TUDES."
  130 PRINT ,,"* FIRST, ENTER THE
 LATITUDE IN:   DEGREES (REMEMBE
R ""-""=SOUTH)   -> ";
  132 INPUT A1
  133 PRINT A1
  135 PRINT
  138 PRINT "* THEN MINUTES",,"->
";
  140 INPUT A2
  141 PRINT A2
  145 FOR Z=10 TO 21
  146 GOSUB 5
  150 PRINT AT 11,0;"* NOW, ENTER
 THE LONGITUDE IN:    DEGREES (R
EMEMBER ""-""=EAST)    -> ";
  152 INPUT O1
  153 PRINT O1
  154 PRINT
  155 PRINT "* THEN MINUTES",,"->
";
  156 INPUT O2
  157 PRINT O2
  160 PRINT AT 18,0;"* THE NAME O
F THIS GEOGRAPHIC     LOCATION I
S:",,"-> ";
  162 INPUT G$
  163 IF LEN G$>29 THEN PRINT AT
21,0;"[NAME IS TOO LONG  TRY S
[HORT]"
  164 IF LEN G$<=29 THEN PRINT AT
 20,4;G$
  165 IF LEN G$<=29 THEN PRINT AT
 21,0;"[COPY COM MAME IN FREE END
 S:0:E0]"
  166 IF LEN G$>29 THEN GOTO 160
  170 GOSUB 4
  180 PRINT AT 4,0;"* FOR HOW MAN
Y DAYS DO YOU WANT   A PRINTOUT?
",,"-> ";
  182 INPUT NR
  183 PRINT NR
  185 PRINT
  190 PRINT "* DO YOU WANT A HARD
COPY (Y/N)?-> ";
  192 INPUT P$
  193 IF P$="Y" THEN PRINT "[FREE
 MOD  S:E1:E2]"
  194 IF P$="N" THEN PRINT "[MO S
ERS  S:E1]"
  195 FOR Z=1 TO 50
  196 NEXT Z
  200 CLS
  210 IF P$<>"Y" THEN GOTO 240
  240 LET A3=A1+A2/60
  242 LET O3=O1+O2/60
  250 IF A3>=0 THEN LET A$=" N LA
T;"
  252 IF A3<0 THEN LET A$=" S LAT
;"
  260 IF O3>=0 THEN LET O$=" W LO
NG"
  262 IF O3<0 THEN LET O$=" E LON
G"
  270 LET A4=INT (A3*100+.5)/100
  280 LET O4=INT (O3*100+.5)/100
  290 LET RAD=57.2958
  292 LET P1=3.14159/26
  300 LET A3=A3/RAD
  310 DIM N(12)
  311 LET N(1)=0
  312 LET N(2)=31
  313 LET N(3)=59
  314 LET N(4)=90
  315 LET N(5)=120
  316 LET N(6)=151
  317 LET N(7)=181
  318 LET N(8)=212
  319 LET N(9)=243
  320 LET N(10)=273
  321 LET N(11)=304
  322 LET N(12)=334
  375 PRINT "********************
************ SUNRISE/SUNSET  CA
LCULATIONS ********************
************"
  376 IF P$="Y" THEN LPRINT "****
**************************** SU
NRISE/SUNSET  CALCULATIONS *****
**************************"
  378 IF P$="Y" THEN LPRINT AT 4,
4;"THIS COMPUTATION IS FOR:"
  379 PRINT AT 4,4;"THIS COMPUTAT
ION IS FOR:"
  380 PRINT ABS (A4);A$,ABS (O4);
O$
  381 IF P$="Y" THEN LPRINT ABS (
A4);A$,ABS (O4);O$
  385 PRINT
  386 IF P$="Y" THEN LPRINT
  390 PRINT TAB 6;"GEOGRAPHIC LOC
ATION:","-> ";G$
  391 IF P$="Y" THEN LPRINT TAB 6
;"GEOGRAPHIC LOCATION:","-> ";G$
  400 PRINT
  401 IF P$="Y" THEN LPRINT
  410 PRINT "* ALL TIMES ARE LIST
ED IN UTC.    SOME MAY BE THE NE
XT (OR PREV-  IOUS) GMT DAY."
  419 IF P$="Y" THEN LPRINT "* AL
L TIMES ARE LISTED IN UTC.    SO
ME MAY BE THE NEXT (OR PREV-  IO
US) GMT DAY."
  425 PRINT AT 21,3;"* PRESS [ENTE
R] TO CONTINUE *"
  426 INPUT Z$
  427 GOSUB 4
  428 IF B>0 THEN CLS
  435 IF B>0 THEN GOTO 1015
  440 LET B$="* THIS LATITUDE THE
SUN DOESN""T   SET ON:  "
  450 LET C$="* THIS LATITUDE THE
SUN DOESN""T   RISE ON:  "
  460 LET F$="DATE [SRISE [SSET
[DECL [TTL"
  470 LET J$="MM/DD [HR:MN [HR:MN
[DGRS [HR:MN"
  480 PRINT AT 4,0;"
                    ";F$
  485 PRINT J$
  486 PRINT "
                    "
  490 IF P$<>"Y" THEN GOTO 520
  505 LPRINT "
                    "
  510 LPRINT F$
  515 LPRINT J$
  516 LPRINT "
                    "
  520 LET K=N(M)+DA
  540 FOR Q=1 TO NR
  545 LET B=B+1
  570 LET DT=K-N(M)
  580 IF DT=32 THEN LET DT=1
  590 IF K<366 THEN GOTO 610
  600 LET M=1
  602 LET DA=1
  603 LET K=1
  610 IF M=12 THEN GOTO 640
  620 IF K>N(M+1) THEN LET DT=K-(
N(M+1))
  630 IF K>N(M+1) THEN LET M=M+1
  640 LET X=P1*K/7
  650 LET K=K+1
  660 LET D=.456-22.915*COS (X)-.
43*COS (2*X)-.156*COS (3*X)+3.83
*SIN (X)+.06*SIN (2*X)-.082*SIN
(3*X)
  670 LET E=.008+.51*COS (X)-3.19
7*COS (2*X)-.106*COS (3*X)-.15*C
OS (4*X)-7.317*SIN (X)-9.471*SIN
 (2*X)-.391*SIN (3*X)-.242*SIN (
4*X)
  690 LET DE=D/RAD
  700 LET Y=TAN (DE)*TAN (A3)
  710 IF A3<0 THEN LET H$="BELOW"
  715 IF A3>=0 THEN LET H$="ABOVE
"
  720 IF Y>=1 THEN GOTO 960
  730 IF Y<=-1 THEN GOTO 990
  740 LET AR=-ATN (Y/SQR (-Y*Y+1)
)+1.5707633
  750 LET AC=AR*RAD
  760 LET RI=03/15+AC/15
  765 LET RI=RI-E/60
  770 LET ST=03/15-AC/15
  775 LET ST=ST-E/60
  780 LET LT=ST-RI
  790 IF LT<0 THEN LET LT=24+LT
  800 IF (LT-INT (LT))>.99 THEN L
ET LT=(INT ((LT*100)+.6))/100
  810 LET LH=INT (LT)
  820 LET LM=(LT-INT (LT))*60
  830 IF RI>24 THEN LET RI=RI-24
  840 IF RI<0 THEN LET RI=RI+24
  850 IF (RI-INT (RI))>.99 THEN L
ET RI=(INT ((RI*100)+.6))/100
  860 LET R1=INT (RI)
  870 LET R2=(RI-INT (RI))*60
  880 IF ST>24 THEN LET ST=ST-24
  890 IF ST<0 THEN LET ST=ST+24
  900 IF (ST-INT (ST))>.99 THEN L
ET ST=(INT ((ST*100)+.6))/100
  910 LET S1=INT (ST)
  920 LET S2=(ST-INT (ST))*60
  930 PRINT M;"/";DT;TAB 5;"[";R1
;":";INT (R2+.5);TAB 12;"[";S1;"
:";INT (S2+.5);TAB 19;"[";INT (D
+.5);TAB 24;"[";LH;":";INT (LM+.
5)
  940 IF P$="Y" THEN LPRINT M;"/"
;DT;TAB 5;"[";R1;":";INT (R2+.5)
;TAB 12;"[";S1;":";INT (S2+.5);T
AB 19;"[";INT (D+.5);TAB 24;"[";
LH;":";INT (LM+.5)
  950 GOTO 1010
  960 PRINT H$;B$;M;DT
  970 IF P$="Y" THEN LPRINT H$;B$
;M;DT
  980 GOTO 1010
  990 PRINT H$;C$;M;DT
 1000 IF P$="Y" THEN LPRINT H$;C$
;M;DT
 1010 IF B=12 THEN GOTO 425
 1015 IF B=12 THEN LET B=0
 1016 NEXT Q
 1020 IF P$<>"Y" THEN GOTO 1040
 1040 PRINT AT 21,0;"*  PRESS [ENT
ER] TO CONTINUE  *"
 1045 INPUT Z$
 1050 CLS
 1060 PRINT "********************
************     EXIT PROGR
AM          ********************
************"
 1070 PRINT AT 4,0;"* TO RUN THIS
 PROGRAM AGAIN      PRESS [R]."
 1080 PRINT AT 7,0;"* TO SIMPLY E
XIT THE PROGRAM    PRESS [S]."
 1090 LET Z$=INKEY$
 1095 IF Z$="" THEN GOTO 1090
 1100 IF Z$="R" THEN RUN
 1105 IF Z$="S" THEN STOP
 1110 GOTO 1090
 1200 CLS
 1210 PRINT "  * KA2LHO HAM HELPE
R SERIES *  "
 1215 PRINT ,,,
 1220 PRINT TAB 12;"PRESENTS"
 1230 PRINT ,,,,"*****************
*****************";TAB 31;"**
    SUNRISE, SUNSET        **";T
AB 31;"**********************
********"
 1235 PRINT ,,TAB 9;"ADAPTED FOR
THE"
 1240 PRINT TAB 4;"TIMEX/SINCLAIR
 COMPUTERS"
 1245 PRINT TAB 15;"BY"
 1250 PRINT TAB 9;"KRAIG D. PRITT
S"
 1255 PRINT TAB 13;"KA2LHO"
 1260 PRINT AT 21,0;"(C) 1985, KR
AIG D. PRITTS-KA2LHO"
 1265 FOR Z=1 TO 50
 1266 NEXT Z
 1270 GOTO 80
 1300 CLS
 1310 PRINT "START TAPE",,"PRESS
[ENTER]"
 1320 INPUT Z$
 1330 PRINT USR 8683
 1340 SLOW
 1350 RUN

================================
 NOTE: THIS LISTING FROM A ZX81
 TS 2068 PROGRAM IS SIMILAR.
```

```
  900 REM ARC-SUPRESSION NETWORK
COPYRIGHT:H.GRANHOLM>-0H0NC.,,,
  910 PRINT "*****ARC-SUPRESSION
NETWORK*****"
  920 PRINT "RESISTOR AND CAPACIT
OR ARE CONN-ECTED IN SERIES ACRO
SS CONTACTS OF SWITCH OR RELAY."
  930 PRINT "VOLTAGE     ";
  950 INPUT V
  960 PRINT V;" VOLT"
  970 PRINT "CAPACITOR ";
  980 INPUT C
  990 PRINT C;" MF"
 1000 LET R=V/(10*(3.16*SQR C))**
1+50/V
 1110 PRINT "RESISTANCE ";INT (R*
100)/100;" OHM"
 1120 PAUSE 4E4
 1130 PRINT
 1140 GOTO 930
 1150 SAVE "AR[S]"
 1160 GOTO 910


*****ARC-SUPRESSION NETWORK*****

RESISTOR AND CAPACITOR ARE CONN-
ECTED IN SERIES ACROSS CONTACTS
OF SWITCH OR RELAY.

VOLTAGE     220 VOLT
CAPACITOR .047 MF
RESISTANCE 32.34 OHM

VOLTAGE     12 VOLT
CAPACITOR 0.22 MF
RESISTANCE 4.97 OHM

VOLTAGE     5 VOLT
CAPACITOR 0.47 MF
RESISTANCE 10.23 OHM
```

"ATT"

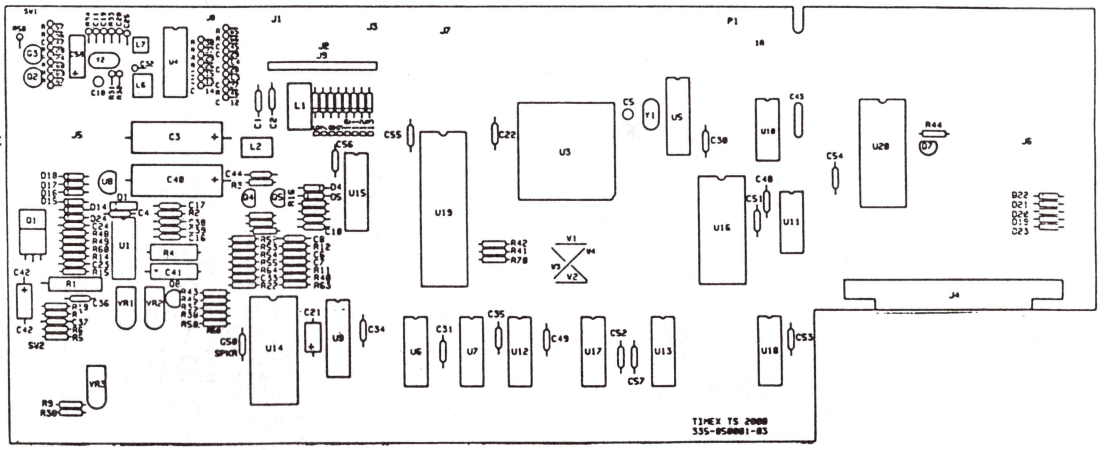
```
 10 REM ATTENUATORS
 20 PRINT "******RESISTIVE ATTE
NUATORS******"
 30 PRINT "FOR ATTENUATING RF-P
OWER OR FOR MATCHING DIFFERENT I
MPEDANCES."
 40 PRINT "IF NEGATIVE RESISTAN
CE-VALUES  ARE ENCOUNTERED THE
MATCHING-  RATIO IS TOO LARGE.
TRY MATCHING IN TWO STEPS."
 50 PRINT "ENTER 0 FOR POWER IN
 IF WATTAGE IS NOT NEEDED OR ATT
ENUATION IS KNOWN."
 55 PRINT "COPYRIGHT (C) 1984 G
.OHONC  STRANDG.4, SF-22100
MARIEHAMN"
 60 PRINT "PRESS N/L TO START"
 70 PAUSE 4E4
 80 CLS
 90 PRINT "ENTER T FOR T-NETWOR
K ATTENUATOR -""-  P  "" PI-  -"
"-  -""-
 92 PAUSE 4E4
 94 IF INKEY$="" THEN GOTO 94
100 LET C$=INKEY$
110 PRINT "ENTER POWER IN : ";
120 INPUT WI
130 PRINT WI
135 PRINT
140 IF WI=0 THEN GOTO 180
150 PRINT "ENTER POWER OUT: ";
160 INPUT WO
170 PRINT WO
180 PRINT "ENTER INPUT IMPEDANC
E: ";
190 INPUT ZI
200 PRINT ZI;" OHMS"
210 PRINT "ENTER OUTPUT IMPEDAN
CE: ";
220 INPUT ZO
230 PRINT ZO;" OHMS"
240 PRINT "ENTER DB-VALUE:
  ";
250 IF WI<>0 THEN LET DB=LN (WI
/WO)/LN 10*10
260 IF WI<>0 THEN GOTO 280
270 INPUT DB
280 PRINT "-";INT (DB*10)/10;"
DB"
290 PAUSE 100
300 CLS
310 FAST
320 PRINT "UNBALANCED RESISTIVE
 ATTENUATOR"
330 IF C$="P" THEN GOTO 360
340 PRINT TAB 10;"T-NETWORK"
350 GOTO 370
360 PRINT TAB 10;"PI-NETWORK"
370 PRINT "Z(IN)=";ZI;" OHMS";"
Z(OUT)=";ZO;" OHMS"
380 IF C$="P" THEN GOTO 410
390 PRINT "ATT.";TAB 8;"R1","R2
";TAB 24;"R3"
400 GOTO 420
410 PRINT "ATT.";TAB 8;"R4","R5
";TAB 24;"R6"
420 PRINT "DB";TAB 8;"OHMS","OH
MS";TAB 24;"OHMS"
430 PRINT "----------------------
--------"
440 LET F=ZI/ZO
450 REM
460 LET N=SQR (10**(.1*DB)*F)
470 LET G=2*N
480 LET H=N*N+F
490 LET I=N*N-F
500 LET J=G/I
510 LET K=H/I
550 LET VI=SQR (WI*ZI)
570 LET VO=VI/N
580 LET VD=VI-VO
600 IF C$="P" THEN GOTO 730
610 LET R2=ZI*J
620 LET R3=ZO*K-R2
630 LET R1=ZI*K-R2
640 LET I2=(VI+VO)/(2*R2+R1)
650 LET I3=(VI-I2*(R1+R2))/R1
660 LET I1=I2+I3
670 LET W1=(I1*I1)*R1
680 LET W2=(I2*I2)*R2
690 LET W3=(I3*I3)*R3
700 PRINT "-";INT (DB*10)/10;TA
B 8;INT (R1+.5);INT (R2+.5);TAB
24;INT (R3+.5)
710 PRINT "WATTS";TAB 8;INT (W1
*100)/100,INT (W2*100)/100;TAB 2
4;INT (W3*100)/100
715 PRINT TAB 8;"O---[R1]---[R3
]---O";TAB 16;"
";"  [R2]
720 GOTO 820
730 LET R5=1/(1/ZO*J)
740 LET R6=1/(1/ZI*K-1/R5)
750 LET R4=1/(1/ZI*K-1/R5)
760 PRINT "-";INT (DB*10)/10;TA
B 8;INT (R4+.5);INT (R5+.5);TAB
24;INT (R6+.5)
770 LET W4=VI*VI/R4
780 LET W5=VD*VD/R5
790 LET W6=VO*VO/R6
800 PRINT "WATTS";TAB 8;INT (W4
*100)/100,INT (W5*100)/100,TAB 2
4;INT (W6*100)/100
810 PRINT TAB 8;"O------[R4]----
--O";TAB 11;"  R5  ";TAB 11
;"|";TAB 21;"|";TAB 11;"[R6]";TAB 2
1;"|";TAB 11;"[R4]";TAB 21;"[R5]";
TAB 11;"|";TAB 21;"|";TAB 11;"|";TAB 21;"|
";TAB 10;"---";TAB 20;"---"
820 PAUSE 4E4
830 CLS
840 GOTO 90
850 SAVE "AT"
860 GOTO 20
```

```
ENTER T FOR T-NETWORK ATTENUATOR
 -"-  P  " PI-  -"-  -"-

ENTER POWER IN : 10

ENTER POWER OUT: 0.2

ENTER INPUT IMPEDANCE:  50 OHMS

ENTER OUTPUT IMPEDANCE: 50 OHMS

ENTER DB-VALUE:          -16.9 DB

UNBALANCED RESISTIVE ATTENUATOR

              T-NETWORK
Z(IN)=50 OHMS    Z(OUT)=50 OHMS

ATT.      R1        R2        R3
DB        OHMS      OHMS      OHMS
-------------------------------
-16.9     38        14        38

WATTS     7.52      2.12      0.15

        O---[R1]---[R3]---O
                    |
                   [R2]
                    |
                    |
                   ---

UNBALANCED RESISTIVE ATTENUATOR

              PI-NETWORK
Z(IN)=50 OHMS    Z(OUT)=50 OHMS

ATT.      R4        R5        R6
DB        OHMS      OHMS      OHMS
-------------------------------
-16.9     66        173       66

WATTS     7.52      2.12      0.15

        O------[R5]------O
               |         |
              [R4]      [R6]
               |         |
               |         |
              ---       ---
```

```
 5 REM TRANSLATED FOR 2068 WA6DLI
 10 PRINT : PRINT
 15 PRINT "This program calculates FRESNEL 'lens' antenna for Satellite use wit
h LNA": PRINT
 20 INPUT "HOW MANY ZONES";N
 30 PRINT "Zones = ";N; TAB 15;"Gain = "; INT (20*( LN n/2.30258509));" db"
 40 INPUT "WHAT IS OUTSIDE DIAMETER?(CM)";R
 41 IF R <= 48 THEN  LET R=R*12*2.54: PRINT "Since you entered feet, then"'"I'
l compute CM!"
 42 PRINT "All units same as Radius!"
 45 LET RM=R/2
 60 PRINT "Then Radius = ";RM;" Cm"
 65 PRINT "No."; TAB 6;"Raw"; TAB 12;"Cut at:"
 70 LET R1= INT (.5+100*(RM/ SQR N))/100
 80 PRINT "R1"; TAB 5;" 1.00"; TAB 12;R1
 85 DIM q(50)
 90 FOR X=2 TO N
100 LET SX= INT (.5+100* SQR X)/100
110 LET J= INT (.5+100*(R1*SX))/100
115 LET q(x)=j
120 PRINT "R";X; TAB 6;SX; TAB 12;J
130 NEXT X
140 PRINT : PRINT
150 PRINT "SEE RADIO-ELECTRONICS  OCT '85 p58": PRINT "Press any key to see"
152 PAUSE 4e4: CLS
154 IF RM>243.84 THEN  PRINT "I will run out of Screen"'"for 16 ft. or bigger
ntenna!"'" I can draw a smaller one.": STOP
155 FOR x=2 TO n
160 CIRCLE 125,90,q(x)/3
165 NEXT x
168 PRINT  AT 10,14; INT ((r1*r1)/7.645)
170 PRINT #1;"R1= ";R1;" R";n;"=";q(n)," cm FL @ center!": PAUSE 0
```

The above program relates to the article in the October 1985 Radio Electronics for a FLAT satellite antenna that can be cut out of plywood or maybe painted on mylar! The program gives the needed info to draw the circles and calculates the C band focal length based on the number of Zones chosen and prints in center of circle.

Translated for 2068 by WA6DLI 9/85



TS2068 PC BOARD COMPONENT LAYOUT

750 North Yaleton Avenue
West Covina, CA 91790
November 27, 1985

QZX
c/o Alex Burr
2025 O'Donnell Drive
Las Cruces, NM 88001

Dear Alex & Bo,

Well, Happy Thanksgiving season! I just received a couple of programs that I thought I should tell you about.

The first was one I ordered when you mentioned that Hawg Wild Software was closing down and had some ham radio programs as well as Spectrum and Forth offerings. I had enjoyed my version of Minimuf that was once published in early QZX for the ZX81 and was by KQ2F I believe.

This early ZX81 version had a nice graphical display of the MUF versus time for the latitude, longitude, of both stations when the proper date and flux number from WWV was input. Because of this I just assumed that any version for the 2068 would have super graphics with the color and high resolution available. So when I saw the program MiniMuf 3.5 by Earl Cunningham, K6SE for the 2068, I ordered it from Hawg Wild.

The program comes with 2 pages of text that gives credit to the U.S. Navy and the December 1982 issue of QST. The documentation is adaquate for the meager program, which just lists to the screen a table that can be printed out. There are options to update the data for station location changes, or new dates and flux data. The cost is $17.95 + p/h from Hawg Wild.

In fairness the program does all that it claims. My only complaint is that it is the most rudimentary version of the program I have seen and doesn't do justice to the 2068 although a colored title page is used and input inquires are flashed. I guess I will just have to dig out my ZX-81 version and upload it to the 2068 and revise the graphics of KQ2F.

The second program I received from Thomas B. Woods of ZX Profile fame, in New Hampshire (P.O. Box 64, Jefferson 03583) is as spectacular as the first was dull. And at about the same price $19.95 plus $1.50 postage.

It is called "Extended Basic for the TS1000/1500" which means the ZX-81 really as shown in the exciting demo side of the tape. The program is an international effort as the author is a Frits Beniest of Holland but the 23 page manual is by the author and Fred Nachbar, the original publisher of SyncWare News, now in British Columbia, Canada and the whole package is published by Tom Woods.

Just what does "Extended BASIC" do...well it almost makes B&W 2068 out of your ZX81/TS1000/1500...the only thing it lacks is it doesn't add lowercase or high resolution graphics but it does add commands like CIRCLE and the screen graphics in the form of windows, block moves, scrolls, wipes, etc. are smooth and of amazing speed. One of the demo screens shows a flow 6000 characters/sec moving across the screen.

Why would you want to upgrade...the most likely reason if you like to acquire programs from published sources is the ability to now use the program without a lot of rewriting to get around DATA, READ, and RESTORE statments. Well, just to complete the icing on the cake here are the other statments added besides the four just mentioned:
DRAW, UNDRAW, UNCIRCLE, FILL, PAPER, UNPAPER, PRINT, PRINT AT (similar but include automatic scroll, no more out of screen), MOVE, SCROLL (moves entire display up no. of lines specified), COPY, CLS, SCREEN (like Point on 2068), MID$, LEFT$, RIGHT$. While Sinclair string slicing is better using TO..the last three allow you to follow programs written for other computers.

The thing that fascinated me was the way that the system combined normal Sinclair basic using keywords with the new additions which cannot be entered as keywords but must be spelled out as on other computers. All the extended basic commands are imbedded in a REM statement with a normal line number. Since multiple statements separated by a colon are permitted, this works out to perfection. The REM line is only activated if preceeded by a line GOSUB 0. Immediately after execution the program goes on to the next program line following the REM line, which can be a regular tokenized Sinclair basic line. There are only a few new rules which aren't hard to follow: like a semi-colon follows a command and commas and colons are reserved to separate data and statements.

Variables must be defined in Sinclair basic before they can be used even in a DATA statement..but this is done in a clever way. At the beginning of a program you might have several Sinclair basic lines: LET N=7 LET M=12 LET G=0.2 Some lines later the data statement could be these two lines:

```
xxxx .....reg Sinclair basic
xxxx GOSUB 0
xxxx REM DATA; 20, 1, 17, (N), 36, (G), 113, (M), 2,
xxxx .....reg Sinclair basic
```

But note that the variables enclosed in () are used in the normal way except they are in parenthesis and were defined earlier in the program. Because they are defined, I was able to load the program into my Exatron Stringy-Floppy system directly. The booklet is very complete with some programs to type in and with even a small merging program to add the Line 0 machine language to your existing program. The demo side of the tape takes almost 4 minutes to load (nearly 16K) and really shows off the possible graphics.

To make things even better the program generates its own error reports to catch those times you forget some of the rules and they are specific to the line number and fault: e.g. ;/1230 means line 1230 is missing a necessary ; where it should be. The program giveserror reports rather than crashing!

My ZX-81 is the heart of my Ham radio computer system, even though the 2068 is used for word processing etc. so I am thrilled to add to its accomplishents and hope to further embellish my logs and other displays.

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TWO, 3 AND 4 ELEMENT YAGI BEAM DESIGN

BY TOM WINTERNITZ, W2MS, BOX 73, MERRY POINT, VA. 22513

```
  2 DIM M(30): DIM N(30)
  3 LET P$="H"
  5 PRINT "HORIZONTAL OR VERTICAL PATTERN ? - INPUT H OR V -      "
  6 INPUT P$: PRINT P$
 10 DATA 71.66,24.27,67.33,7.54,60.43,-7.10,51.40,-19.17,40.79,-28.35,29.26,-34
.44,17.50,-37.42,6.22,-37.43,-3.97,-34.78,-12.53,-29.93
 11 DATA -19.06,-23.42,-23.31,-15.87,-25.21,-7.94,-24.86,-.25,-22.5,6.63,-18.49
,12.26,-13.32,16.29,-7.49,18.55,-1.55,18.99,4.01,17.74
 12 DATA 8.75,15.04,12.32,11.22,14.52,6.71,15.25,1.94,14.56,-2.66,12.59,-6.7,9.
62,-9.84,5.97,-11.88,2.01,-12.7,-1.89,-12.3
 15 FOR I=1 TO 30
 17 READ M(I): READ N(I)
 18 NEXT I
 19 PRINT "INPUT LENGTH/DIA. OF ELEMENTS   -  ";: INPUT K
 20 IF K<100 OR K>100000 THEN  GO TO 19
 21 LET K=K*4: PRINT K/4
 22 PRINT "NUMBER OF ELEMENTS?(2,3,4)  - ";: INPUT E
 23 IF E<2 OR E>4 THEN  GO TO 22
 24 PRINT E
 25 PRINT "INPUT LENGTH (F/FR) OF DRIVEN   ELEMENT   -  ";
 27 INPUT FFR1: PRINT FFR1
 35 PRINT "INPUT LENGTH (F/FR) & SPACING   OF REFLECTOR ELEMENT   -  ";
 36 INPUT FFR2: PRINT FFR2;
 40 INPUT SP1
 41 PRINT "   ";SP1
 42 GO SUB 230
 43 IF E=2 THEN  GO TO 75
 45 PRINT "INPUT LENGTH (F/FR) & SPACING   OF DIRECTOR 1  ELEMENT-";
 46 INPUT FFR3: PRINT FFR3;
 50 INPUT SP2
 51 PRINT "   ";SP2
 52 GO SUB 220
 53 IF E=3 THEN  GO TO 88
 55 PRINT "INPUT LENGTH (F/FR) OF DIR. 2   & SPACING  DIR.1 TO DIR. 2      ELEM
ENT   -  ";
 56 INPUT FFR4: PRINT FFR4;
 57 INPUT SP3
 58 PRINT "   ";SP3
 60 CLS : LET E=4: PRINT "FOUR ELEMENTS -","           PTRN.": PRINT FFR2;" (";
SP1;") ";FFR1;" (";SP2;") ";FFR3;" (";SP3;") ";FFR4: PRINT "L/D=";K/4
 61 GO SUB 110
 65 GO SUB 5400
 68 GO SUB 200
 70 GO TO 3000
 75 CLS : LET E=2: PRINT "TWO ELEMENTS -","           PTRN.": PRINT FFR2;" / ("
;SP1;") / ";FFR1;"     ";"L/D=";K/4
 76 GO SUB 110
 78 GO SUB 5400
 80 GO SUB 230
 86 GO TO 4900
 88 CLS : LET E=3: PRINT "THREE ELEMENTS-","           PTRN.": PRINT FFR2;" (";
SP1;") ";FFR1;" (";SP2;") ";FFR3: PRINT "L/D=";K/4
 89 GO SUB 110
 90 GO SUB 5400
 95 GO SUB 220
 99 GO TO 5000
110 IF P$="H" THEN  PRINT  AT 0,16;"HORIZONTAL": PRINT
115 IF P$="V" THEN  PRINT  AT 0,16;"VERTICAL  ": PRINT
120 RETURN
200 LET R44=73: LET X44=(430.30*.4343* LN K-320)*(FFR4-1)
204 LET U=(SP2+SP3)*20: GO SUB 6100
205 LET R14=M: LET X14=N
209 LET U=(SP1+SP2+SP3)*20: GO SUB 6100
210 LET R24=M: LET X24=N
214 LET U=(SP3)*20: GO SUB 6100
215 LET R34=M: LET X34=N
220 LET R33=73: LET X33=(430.30*.4343* LN K-320)*(FFR3-1)
224 LET U=(SP2)*20: GO SUB 6100
225 LET R13=M: LET X13=N
226 LET U=(SP1+SP2)*20: GO SUB 6100
227 LET R23=M: LET X23=N
230 LET R11=73: LET X11=(430.30*.4343* LN K-320)*(FFR1-1)
235 LET R22=73: LET X22=(430.30*.4343* LN K-320)*(FFR2-1)
239 LET U=SP1*20: GO SUB 6100
240 LET R12=M: LET X12=N
245 RETURN
3049 LET AR=R33: LET AX=X33: LET DR=R44: LET DX=X44: LET BR=R34: LET BX=X34: LET
 CR=BR: LET CX=BX: GO SUB 5100
3050 LET CFR1=CFR: LET CFX1=CFX
3051 LET AR=R23: LET AX=X23: LET DR=R44: LET DX=X44: LET BR=R34: LET BX=X34: LET
 CR=R24: LET CX=X24: GO SUB 5100
3052 LET CFR2=CFR: LET CFX2=CFX
3053 LET AR=R23: LET AX=X23: LET DR=R34: LET DX=X34: LET BR=R33: LET BX=X33: LET
 CR=R24: LET CX=X24: GO SUB 5100
3054 LET CFR3=CFR: LET CFX3=CFX
3055 LET AR=R13: LET AX=X13: LET DR=R44: LET DX=X44: LET BR=R34: LET BX=X34: LET
 CR=R14: LET CX=X14: GO SUB 5100
3056 LET CFR4=CFR: LET CFX4=CFX
3057 LET AR=R13: LET AX=X13: LET DR=R34: LET DX=X34: LET BR=R33: LET BX=X33: LET
 CR=R14: LET CX=X14: GO SUB 5100
3058 LET CFR5=CFR: LET CFX5=CFX
3059 LET AR=R13: LET AX=X13: LET DR=R24: LET DX=X24: LET BR=R23: LET BX=X23: LET
 CR=R14: LET CX=X14: GO SUB 5100
3060 LET CFR6=CFR: LET CFX6=CFX
3061 LET AR=R22: LET AX=X22: LET DR=CFR1: LET DX=CFX1: GO SUB 5200
3062 LET CR11=MPR: LET CX11=MPX
3063 LET AR=R23: LET AX=X23: LET DR=CFR2: LET DX=CFX2: GO SUB 5200
3064 LET CR12=MPR: LET CX12=MPX
3066 LET AR=R24: LET AX=X24: LET DR=CFR3: LET DX=CFX3: GO SUB 5200
3067 LET CR13=MPR: LET CX13=MPX
3068 LET CR1=CR11-CR12+CR13: LET CX1=CX11-CX12+CX13
3071 LET AR=R12: LET AX=X12: LET DR=CFR1: LET DX=CFX1: GO SUB 5200
3072 LET CR21=MPR: LET CX21=MPX
3073 LET AR=R23: LET AX=X23: LET DR=CFR4: LET DX=CFX4: GO SUB 5200
3074 LET CR22=MPR: LET CX22=MPX
3076 LET AR=R24: LET AX=X24: LET DR=CFR5: LET DX=CFX5: GO SUB 5200
3077 LET CR23=MPR: LET CX23=MPX
3078 LET CR2=CR21-CR22+CR23: LET CX2=CX21-CX22+CX23
3081 LET AR=R12: LET AX=X12: LET DR=CFR2: LET DX=CFX2: GO SUB 5200
3082 LET CR31=MPR: LET CX31=MPX
3083 LET AR=R22: LET AX=X22: LET DR=CFR4: LET DX=CFX4: GO SUB 5200
3084 LET CR32=MPR: LET CX32=MPX
3086 LET AR=R24: LET AX=X24: LET DR=CFR6: LET DX=CFX6: GO SUB 5200
3087 LET CR33=MPR: LET CX33=MPX
3088 LET CR3=CR31-CR32+CR33: LET CX3=CX31-CX32+CX33
3091 LET AR=R12: LET AX=X12: LET DR=CFR3: LET DX=CFX3: GO SUB 5200
3092 LET CR41=MPR: LET CX41=MPX
3093 LET AR=R22: LET AX=X22: LET DR=CFR5: LET DX=CFX5: GO SUB 5200
3094 LET CR42=MPR: LET CX42=MPX
3096 LET AR=R23: LET AX=X23: LET DR=CFR6: LET DX=CFX6: GO SUB 5200
3097 LET CR43=MPR: LET CX43=MPX
3098 LET CR4=CR41-CR42+CR43: LET CX4=CX41-CX42+CX43
4000 LET AR=R11: LET AX=X11: LET DR=CR1: LET DX=CX1: GO SUB 5200
4002 LET DDR1=MPR: LET DDX1=MPX
4004 LET AR=R12: LET AX=X12: LET DR=CR2: LET DX=CX2: GO SUB 5200
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4006 LET DDR2=MPR: LET DDX2=MPX
4008 LET AR=R13: LET AX=X13: LET DR=CR3: LET DX=CX3: GO SUB 5200
4010 LET DDR3=MPR: LET DDX3=MPX
4012 LET AR=R14: LET AX=X14: LET DR=CR4: LET DX=CX4: GO SUB 5200
4014 LET DDR4=MPR: LET DDX4=MPX
4020 LET DDR=DDR1-DDR2+DDR3-DDR4
4022 LET DDX=DDX1-DDX2+DDX3-DDX4
4025 LET AR=DDR: LET AX=DDX: LET DR=CR1: LET DX=CX1: GO SUB 5200
4028 LET R=DVR: LET X=DVX
4030 PRINT "R+X="; INT (100*R)/100;"  "; INT (100*X)/100
4050 LET AR=CR2: LET AX=CX2: LET DR=CR1: LET DX=CX1: GO SUB 5200
4052 LET AR2=DVR: LET AX2=DVX
4054 LET AR=CR3: LET AX=CX3: LET DR=CR1: LET DX=CX1: GO SUB 5200
4056 LET AR3=DVR: LET AX3=DVX
4058 LET AR=CR4: LET AX=CX4: LET DR=CR1: LET DX=CX1: GO SUB 5200
4060 LET AR4=DVR: LET AX4=DVX
4062 GO SUB 5500
4063 STOP
4064 LET SP1=SP1+.01: PRINT SP1: GO TO 62
4068 LET FFR3=FFR3-.02: LET FFR4=FFR4-.02: PRINT FFR3;" ";FFR4: GO TO 62
4069 LET SP3=SP3-.05
4070 GO TO 62
4899 STOP
4900 LET AR=R11: LET AX=X11: LET DR=R22: LET DX=X22: LET BR=R12: LET BX=X12: LET
 CR=BR: LET CX=BX: GO SUB 5100
4905 LET DDR=CFR: LET DDX=CFX
4907 LET AR=DDR: LET AX=DDX: LET DR=R22: LET DX=X22: GO SUB 5200
4909 LET R=DVR: LET X=DVX: PRINT "R+X="; INT (100*R)/100;"  "; INT (100*X)/100
4911 LET AR=R12: LET AX=X12: LET DR=R22: LET DX=X22: GO SUB 5200
4912 GO SUB 5500
4940 STOP
4945 GO TO 4949
4949 LET FFR2=FFR2-.01: PRINT "FFR2=";FFR2: GO TO 80
4950 LET SP1=SP1-.05: PRINT "SP=";SP1: GO TO 80
4999 STOP
5009 LET AR=R22: LET AX=X22: LET DR=R33: LET DX=X33: LET BR=R23: LET BX=X23: LET
 CR=BR: LET CX=BX: GO SUB 5100
5010 LET C3R1=CFR: LET C3X1=CFX
5011 LET AR=R12: LET AX=X12: LET DR=R33: LET DX=X33: LET BR=R23: LET BX=X23: LET
 CR=R13: LET CX=X13: GO SUB 5100
5012 LET C3R2=CFR: LET C3X2=CFX
5013 LET AR=R23: LET AX=X23: LET DR=R12: LET DX=X12: LET BR=R13: LET BX=X13: LET
 CR=R22: LET CX=X22: GO SUB 5100
5014 LET C3R3=CFR: LET C3X3=CFX
5020 LET AR=R11: LET AX=X11: LET DR=C3R1: LET DX=C3X1: GO SUB 5200
5021 LET DD1R=MPR: LET DD1X=MPX
5024 LET AR=R12: LET AX=X12: LET DR=C3R2: LET DX=C3X2: GO SUB 5200
5025 LET DD2R=MPR: LET DD2X=MPX
5028 LET AR=R13: LET AX=X13: LET DR=C3R3: LET DX=C3X3: GO SUB 5200
5029 LET DD3R=MPR: LET DD3X=MPX
5030 LET DDR=DD1R-DD2R+DD3R
5031 LET DDX=DD1X-DD2X+DD3X
5032 LET AR=DDR: LET AX=DDX: LET DR=C3R1: LET DX=C3X1: GO SUB 5200
5033 LET R=DVR: LET X=DVX
5035 PRINT "R+X="; INT (100*R)/100;" "; INT (100*X)/100
5050 LET AR=C3R2: LET AX=C3X2: LET DR=C3R1: LET DX=C3X1: GO SUB 5200
5052 LET RC321=DVR: LET XC321=DVX
5055 LET AR=C3R3: LET AX=C3X3: LET DR=C3R1: LET DX=C3X1: GO SUB 5200
5056 LET RC331=DVR: LET XC331=DVX
5057 GO SUB 5500
5065 STOP
5066 GO TO 5070
5067 LET SP1=SP1-.05: PRINT "SP1=";SP1: GO TO 90
5069 LET SP2=SP2-.05: PRINT "SP2=";SP2: GO TO 90
5080 STOP
5100 LET MPR=AR*DR-AX*DX: LET CFR=MPR-BR*CR+BX*CX: LET MPX=AX*DR+AR*DX: LET CFX=
MPX-CR*BX-BR*CX: RETURN
5200 LET MPR=AR*DR-AX*DX: LET MPX=AX*DR+AR*DX: LET DVR=(AR*DR+AX*DX)/(DR*DR+DX*D
X): LET DVX=(DR*AX-AR*DX)/(DR*DR+DX*DX): RETURN
5400 REM PLOT AXIES
5405 FOR Y=10 TO 150: LET X=128: PLOT X,Y: NEXT Y
5410 FOR X=100 TO 250: LET Y=86: PLOT X,Y: NEXT X
5415 RETURN
5500 REM PL0T
5506 FOR I=0 TO 2* PI  STEP  PI /20
5508 IF E=2 THEN  LET PVR=(1-DVR)* COS ( PI *SP1* COS I)-DVX* SIN ( PI *SP1* COS
 I)
5510 IF E=2 THEN  LET PVX=(1+DVR)* SIN ( PI *SP1* COS I)-DVX* COS ( PI *SP1* COS
 I)
5512 IF E=4 THEN  LET CO21= COS ( PI *(2*SP1+SP2)* COS I): LET SI21= SIN ( PI *(
2*SP1+SP2)* COS I): LET CO2= COS ( PI *SP2* COS I): LET SI2= SIN ( PI *SP2* COS
I): LET CO32= COS ( PI *(2*SP3+SP2)* COS I): LET SI32= SIN ( PI *(2*SP3+SP2)* CO
S I)
5515 IF E=4 THEN  LET PVR=-AR2*CO21-AX2*SI21+CO2*(1+AR3)-AX3*SI2-AR4*CO32+AX4*SI
32
5517 IF E=4 THEN  LET PVX=-AX2*CO21+AR2*SI21-SI2*(1-AR3)+AX3*CO2-AR4*SI32-AX4*CO
32
5541 IF E=3 THEN  LET CO1= COS (2* PI *SP1* COS I): LET CO2= COS (2* PI *SP2* CO
S I): LET SI1= SIN (2* PI *SP1* COS I): LET SI2= SIN (2* PI *SP2* COS I)
5542 IF E=3 THEN  LET PVR=1-RC321*CO1+RC331*CO2-XC321*SI1-XC331*SI2
5543 IF E=3 THEN  LET PVX=-XC321*CO1+XC331*CO2+RC321*SI1+RC331*SI2
5544 LET PM= SQR (PVR*PVR+PVX*PVX)
5555 IF I=0 THEN  LET FPV=PM
5560 IF I= PI  THEN  LET RPV=PM
5565 IF  SIN (I+ PI /2)=0 THEN  GO TO 5600
5566 LET PD= ABS ( COS ( PI /2* COS (I+ PI /2))/ SIN (I+ PI /2))
5567 IF P$="V" THEN  LET PD=1
5575 LET XP=PD*127*PM/FPV* COS I: LET YP=PD* SQR (73/R)*50*PM/FPV* SIN I
5590 LET X=XP+128: LET Y=YP+86
5593 PLOT X,Y
5600 NEXT I
5605 LET G= SQR (73/R)*FPV
5606 PRINT "G=";2.2+ INT (200*.4343* LN G)/10;" F/B="; INT (200*.4343* LN (FPV/R
PV))/10;" DB"
5700 RETURN
5999 STOP
6116 LET D=U- INT U: LET U= INT U
6117 LET DM=M(U+1)-M(U): LET DN=N(U+1)-N(U)
6118 LET M=M(U)+DM*D: LET N=N(U)+DN*D
6119 RETURN
9000 SAVE "YAGI 4EL"


9099 STOP NOTES:
1. GAIN IS WITH RESPECT TO AN ISOTROPIC RADIATOR.
2. TO LOAD ALL DATA FOR A CONFIGURATION, RUN.
3. TO ENTER NEW REFLECTOR DATA, GO TO 35
4. TO ENTER NEW DIRECTOR 1 DATA, GO TO 45
5. TO ENTER NEW DIRECTOR 2 DATA, GO TO 55
6.  FOR A NEW 2 ELEMENT PATTERN, G0 TO 75
7.  FOR A NEW 3 ELEMENT PATTERN, G0 TO 88
8.  FOR A NEW 4 ELEMENT PATTERN, G0 TO 60
9. SEVERAL OVERLAY PATTERNS MAY BE GENERATED VARYING ONE OR MORE PARAMETER BY AD
JUSTING STATEMENTS IN THE AREA OF 4945/50 F0R 2 ELEMENT; 5066/70 FOR 3 ELEMENT;
4068/75 FOR 4 ELEMENT.
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  6 PRINT TAB 7;"***************
"
  7 PRINT TAB 5;"DXCC-BEARINGS-
DISTANCE"
  8 REM W1EFK
  9 PRINT TAB 7;"***************
"
 15 PRINT
 20 PRINT "DO YOU WANT TO:"
 25 PRINT
 30 PRINT TAB 2;"1)START A NEW
 LIST?"
 40 PRINT TAB 2;"2)SEARCH FOR A
N COUNTRY?"
 70 PRINT TAB 2;"3)ADD NEW COUN
TRY?"
 86 PRINT TAB 2;"4)EXIT PROGRAM
?"
 92 PRINT "ENTER YOUR CHOICE,1-
4"
 96 INPUT A
 99 CLS
 100 IF A=1 THEN GOTO 300
 110 IF A=2 THEN GOTO 3000
 130 IF A=3 THEN GOTO 900
 155 IF A=4 THEN GOTO 2000
 160 GOTO 90
 300 PRINT TAB 3;"START A LIST"
 301 PRINT "******************
************"
 302 PRINT
 304 PRINT "HOW MANY ITEMS ARE T
O BE LISTED?"
 305 DIM I$(325,11)
 307 DIM Q(325)
 308 DIM R(325)
 310 INPUT N
 315 CLS
 322 PRINT
 324 PRINT "ITEM"
 326 PRINT TAB 1;"NO."
 332 FOR B=1 TO 325
 334 PRINT TAB 2;B;" ";
 340 PRINT "PREFIX?"
 350 INPUT I$(B)
 355 PRINT I$(B)
 360 PRINT TAB 5;"LAT?"
 361 INPUT Q(B)
 362 PRINT Q(B)
 365 PRINT TAB 5;"LONG.?"
 366 INPUT R(B)
 367 PRINT R(B)
 370 LET X=B
 375 IF X=N THEN GOTO 390
 380 NEXT B
 390 CLS
 400 PRINT "IF""5/???""APPEARS I
N LOWER LEFT CORNER TYPE""C""TO
CONTINUE LISTING"
 408 PRINT
 410 PRINT "NO.";TAB 5;"PREFIX";
TAB 16;"LAT.";TAB 24;"LONG.";
 420 FOR B=1 TO 325
 430 PRINT TAB 0;B;TAB 4;I$(B);T
AB 16;Q(B);TAB 24;R(B)
 440 LET X=B
 455 IF X=N THEN GOTO 470
 460 NEXT B
 470 PRINT
 471 PRINT "END OF FILE"
 472 PRINT
 475 PRINT "TYPE""1""TO RE-DO  L
IST,""2""TO RETURN TO START"
 480 INPUT P
 482 CLS
 485 IF P=1 THEN GOTO 300
 490 IF P<>1 THEN GOTO 6
 900 PRINT TAB 6;"ADD ITEM TO IN
VENTORY"
 901 PRINT "******************
************"
 902 PRINT
 903 FAST
 906 PRINT "WHEN YOU WISH TO END
 NEW ENTRIES TYPE""RETURN"""
 910 PRINT
 920 PRINT "IF""5/???""APPEARS I
N LOWER LEFT CORNER TYPE ""C""TO
 CONTINUE"
 925 PRINT
 930 PRINT "NO.";TAB 5;"PREFIX";
TAB 16;"LAT.";TAB 24;"LONG";
 935 PRINT
 940 FOR B=1 TO 325
 950 PRINT TAB 0;B;TAB 4;I$(B);T
AB 16;Q(B),TAB 24;R(B)
 960 LET X=B
 965 LET G=N
 970 IF B=325 THEN GOTO 1000
 980 IF X=N THEN GOTO 1040
 990 NEXT B
1000 PRINT "SORRY,FILE IS FULL"
1010 PRINT "TYPE""C""TO RETURN T
O START OF PROGRAM"
1020 STOP
1030 GOTO 6
1040 LET B=B+1
1045 LET N=B
1048 IF G=B THEN GOTO 1000
1050 PRINT
1060 PRINT "ITEM NO.";B
1070 PRINT TAB 3;"PREFIx?";
1080 INPUT C$
1081 PRINT C$
1082 LET I$(B)=C$
1084 IF C$="RETURN" THEN GOTO 11
20
1090 PRINT TAB 3;"LAT.";TAB 3;"L
ONG."
1100 INPUT Q(B)
1101 PRINT Q(B)
1103 INPUT R(B)
1105 PRINT R(B)
1110 GOTO 1040
1120 CLS
1125 LET N=B-1
1130 GOTO 6
1500 PRINT "TYPE""S""TO SAVE""D"
"TO DELETE ""T""TO TERMINATE"
1520 FAST
1580 LET X=1
1590 FOR B=X TO 325
1600 IF I$(B)="" THEN GOTO 1710
1610 LET Y=B
1615 LET X=B
1616 LET Z=N
1620 PRINT TAB 3;I$(B);" ";
1630 INPUT Z$
1635 PRINT Z$
1640 IF Z$="S" THEN GOTO 1710
1650 IF Z$="D" THEN GOTO 1800
1660 IF Z$="T" THEN GOTO 1675
1665 CLS
1670 GOTO 1520
1675 CLS
1680 GOTO 6
1710 IF B=N THEN GOTO 1730
1720 NEXT B
1725 PRINT
1730 PRINT
1735 PRINT "END OF FILE"
1740 PRINT
1750 PRINT "TYPE""1""IF YOU WISH
 TO DELETE OTHER ITEMS,TYPE""2""
TO RETURN TO START OF PROGRAM"
1760 INPUT W
1765 CLS
1770 IF W=1 THEN GOTO 1500
1780 IF W<>1 THEN GOTO 6
1800 LET I$(B)=""
1810 LET Q(B)=0
1812 LET R(B)=0
1815 IF N=B THEN GOTO 1920
1820 FOR B=Y TO 325
1830 LET I$(B)=I$(B+1)
1835 LET Q(B)=Q(B+1)
1836 LET R(B)=R(B+1)
1840 IF Z=B THEN GOTO 1900
1850 NEXT B
1900 LET N=N-1
1908 LET B=X
1909 IF N=B THEN GOTO 1730
1910 GOTO 1590
1920 LET N=N-1
1930 GOTO 1730
2000 PRINT "YOU HAVE INDICATED Y
OU WISH TO EXIT THIS PROGRAM"
2005 PRINT
2010 PRINT "IF YOU HAVE MADE ANY
 CHANGES"
2012 PRINT
2013 PRINT "******************
************"
2015 PRINT "*DO NOT FORGET TO RE
-LOAD TAPE*"
2016 PRINT "******************
************"
2017 PRINT
2018 PRINT "TO SAVE THIS PROGRAM
 AS CHANGED PREPARE THE TAPE REC
ORDER,BEGIN RECORDING,AND TYPE""
C"""
2020 STOP
2030 SAVE "DX.BEARINGS"
2040 GOTO 6
3000 PRINT TAB 7;"TO SEARCH FOR
A COUNTRY INTER THE PREFIX OF TH
AT COUNTRY"
3010 PRINT "******************
************"
3020 PRINT
3030 PRINT "TYPE PREFIX "
3035 FAST
3040 INPUT C$
3042 LET J=LEN C$
3044 DIM M$(325,J)
3048 FOR B=1 TO 325
3052 LET M$(B)=I$(B)
3058 IF C$=M$(B) THEN GOTO 3100
3070 NEXT B
3075 PRINT
3080 PRINT "***NOT IN LIST***"
3090 GOTO 3122
3100 PRINT
3110 PRINT "LAT.";Q(B);,"LONG.";
R(B);
3114 PRINT
3115 PRINT TAB 5;C$
3119 PRINT "LOCATED"
3120 CLS
3121 GOTO 4160
3122 PRINT
3124 PRINT
3130 PRINT "TYPE""1""TO SEARCH A
NOTHER PREFIX,""2""TO RETURN TO
START."
3140 INPUT U
3145 CLS
3150 IF U=1 THEN GOTO 3000
3160 IF U<>1 THEN GOTO 6
4160 LET D=1
4162 LET K=111.11
4163 LET M=57.29577951308238
4164 LET N=60
4165 LET S=69.041
4200 IF D<>1 THEN GOTO 4230
4211 REM LAT.IS NPR FLA.
4212 LET A=28.25
4215 LET A=A/M
4224 REM LONG.IS NPR FLA.
4225 LET L1=82.72
4230 LET L2=R(B)
4231 LET B=Q(B)
4236 LET B=B/M
4250 LET L=(L1-L2)/M
4260 LET E=(SIN A*SIN B)+(COS A*
COS B*COS L)
4270 LET D=-ATN (E/SQR (1-E*E))+
1.57079
4280 LET C=(SIN B-SIN A*E)/(COS
A*SIN D)
4290 IF C>=1 THEN GOTO 4310
4291 IF C<=-1 THEN GOTO 4302
4298 LET C=-ATN (C/SQR (1-C*C))+
1.57079
4301 GOTO 4310
4302 LET C=180/M
4303 GOTO 4310
4310 LET C=C*M
4312 IF SIN L>=0 THEN GOTO 4320
4315 IF SIN L<=0 THEN GOTO 4316
4316 LET C=360-C
4320 LET C=INT ((C+.05)*10)/10
4321 LET J=C
4322 IF J<=180 THEN GOTO 4326
4323 IF J>=180 THEN GOTO 4328
4326 LET J=J+180
4327 GOTO 4330
4328 LET J=J-180
4330 PRINT "*******BEARING IS:**
*****"
4331 PRINT
4332 PRINT C$,"COUNTRY"
4333 PRINT
4334 PRINT C,"DEGREES"
4335 PRINT
4336 PRINT J,"LONG PATH"
4337 PRINT
4340 PRINT "******THE DISTANCE I
S:******"
4345 PRINT
4350 LET X=K*D*M
4351 LET X=INT (X+.5)
4355 PRINT X,"KILOMETERS"
4356 PRINT
4360 LET Y=N*D*M
4361 LET Y=INT (Y+.5)
4375 PRINT Y,"NAUTICAL MILES"
4376 PRINT
4380 LET Z=S*D*M
4381 LET Z=INT (Z+.5)
4385 PRINT Z,"STATUATE MILES"
4387 PRINT
4450 PRINT "ENTER""1""FOR ANOTHE
R BEARING""2""TO RETURN TO START
"
4455 INPUT U
4456 CLS
4457 IF U=1 THEN GOTO 3000
4458 SLOW
4459 IF U<>1 THEN GOTO 6
```

Editor's Doings - W4GHV

With a little luck, QZX December issue will make it there in December! (barely). Alex & I would like to wish everyone a Merry Christmas and hope the holiday season is enjoyed by all. I can't believe it was December 3 years ago that we started up QZX! While the majority of our readers have been with us for the duration, we also have a lot of new readers. Alex & I are putting together a "Best of QZX" book so the newcomers can catch up, stay tuned..

Packet Radio- That's my pet project, along with the Fido bulletin board, and I have accumulated about every article published on packet. Now to find time to read them! Alex & I have just ordered TNC-2 kits and should be on packet before too long. I presented a video tape/talk on packet and the local interest is there, now to just get someone on the air. The December issue of Computer Trader Magazine had some excellent info on packet, and one article indicated a conservative estimate of 8750 terminal node controllers sold. This doesn't count the homebrews, etc. The packet revolution is growing, much like the repeater growth and it appears to be a fascinating & challenging mode of communication. Imagine talking via one of those satellites WAY out there someday. (22,500 miles one way, I believe).

Those interested in learning more about packet should contact the Tucson Amateur Packet Radio Corp, that publishes the PSR Quarterly (P.O. Box 22888, Tucson, AZ, 85734) and The Florida Amateur Digital Communications Association that publishes the FADCA Beacon (812 Childers Loop, Brandon, FL 33511).

The editor/publisher of FADCA, Gwyn Reedy, W1BEL, has formed a company and is offering the new TNC-2 kits at the best prices I've seen so far. They are:

TNC-200 complete kit with cabinet, assy, ref, & oper manuals - CMOS $169.95, NMOS $154.95

TNC-200N same as TNC-200 without cabinet and ref manual - CMOS $134.95, NMOS $119.95

PC2-HTF TNC-200 pc board, hard-to-find parts, EPROMs, assy manual - CMOS $84.95, NMOS $79.95

PC2-BD TNC-200 pc board & assy manual - $39.95

PC2-CAB Aluminum cabinet - $29.95

All prices include UPS shipping within the USA. MC & Visa OK. For ORDERS ONLY 1-800-835-2246 ext. 115, For tech info 813-689-3523, PacComm Packet Radio Systems, 4040 W. Kennedy, Tampa, FL 33609

The above is for information only, is not a paid ad, and Alex & I won't "endorse" it until our packet systems get here!

How about some of the packet experts providing an article for QZX?? Vic Rice has provided articles on how to build a simple RS-232 interface for the Timex/Sinclairs and I will try to get permission to print it. One of them was in March '85 CTM mag. Those of you not familiar with Computer Trader Magazine owe it to yourself to write for a sample copy ($4.25) or subscribe ($18/yr). Their address is 1704 Sam Drive, Birmingham, AL 35235. (Again, a non-paid ad, Alex & I just recently subscribed and like the magazine a lot).

QL Price gets Reasonable- It looks like competition set in so the Sinclair QL is now available for $279.95. That brings it down below its closest 68000 competitor the Atari ST (which isn't quite off the ground yet).

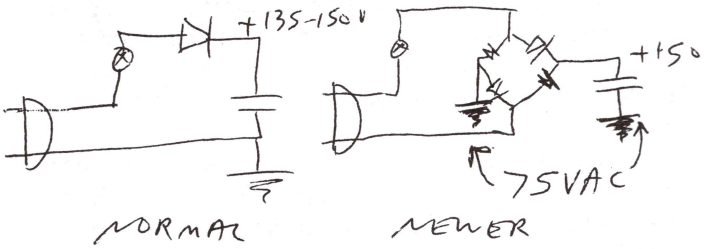
Addresses to contact: 21st Century Electronics, 6813 Polk St., Guttenberg, NJ 07093, 201-869-2616. Zebra Systems, 78-06 Jamaica Ave., Woodhaven, NY 11421, 718-296-2385. Audiovision, 1279 N. Normandie Ave., Los Angeles, CA 90029, 213-660-5217. Curry Computer, 5344 W. Banff Lane, Glendale, AZ 85306, 602-978-2902. Sunset Electronics, 2254 Taraval St., San Francisco, CA 94116, 415-665-8330. Tell them QZX Journal sent you, that should blow their mind! Maybe Alex can twist their arm and get some ads in QZX.

Just received from Zebra Systems was their Fall/Winter '85 catalog. It is impressive, and I was surprised to see a Sinclair ZX-81 Computer KIT offered. It has LOTS of goodies, probably the biggest single source of Timex/Sinclair products.

Bulletin Boards- Teacher's Pet Fido Bulletin Board is growing, with plans of a hard disk soon. It has almost 200 programs in the downloads so far. No Timex/Sinclair programs yet, but there are quite a few for the Tandy Model 100, MS-DOS, Sanyo MBC-555, & Commodore-64. Tel # 505-646-5194 (300/1200 baud). From CTM mag comes the number of a bulletin board dedicated to T/S users. It is 213-329-3922.

Hot Chassis Update - WA1IAO

Here's the schematic we forgot to include last month:



Book Review
Alex. F. Burr K5XY

TIMEX/SINCLAIR SMART TERMINAL
TELECOMMUNICATIONS
by Barry Carter 35 pages

This book is a manual which contains all the information you need to know to use the powerful MTERM Smart II telecommunications program designed for the T/S 2050 modem and the T/S 2068. Many hams who are buying the modems, which can be used with any of the Timex/Sinclair computers, are finding this book helpful.

The modem is not just useful with telephone lines; although it will connect you to the QZX BBS described in last month's issue. The modem can be used with a transceiver to communicate with a similarly equipped station. This is usually done on the VHF bands, but when done, it quickly becomes apparent that you need more than a modem to talk to another computer. You need software too. A simple program comes with the modem but MTERM Smart II is a much more sophisticated program, which is well worth the money.

This manual explains all that Westridge left out and includes many helpful examples. A sample of features covered include:

- Deciphering protocol parameters
- Explaining macro keys
- Uploading/downloading
- Hints and tips
- Translation table interpretation
- Uploading screen displays
- Basic program transfers
- Functional telecommunications glossary
- Hex/ASCII, xlate & control code tables.

The ham will find some of the appendicies particularly useful. One, appendix B, gives a memory map of the T/S 2068. Another, appendix D, describes the four translation tables used by the program. One of the difficulties that the T/S 2068 has when used to talk to other computers directly or over the air is that it does not use the complete standard ASCII character set. These tables give the reader some idea as to how this problem can be solved when our computers are used for RTTY or packet radio.

The book itself is 35 mimeographed pages stapled between heavy covers. It was written on a T/S 2068 and an Epsom RX-80 printer. The pages are printed on one side and are very readable. The text is well written, easily understandable, but not polished. There are no pictures, but none are needed. A number of useful and readable tables are included.

Partial T/S 2068 Parts List

Description	Designation	#
Diode 1N148	CR4-28	25
Diode 1N5821	CR1	1
IC UA 78S40 NPC switching regulator	U1	1
IC SCLD	U3	1
IC LM1889 video modulator	U4	1
IC 74LS244N	U5	1
IC TMS4416-15 (150nS) MOS dynamic RAM	U6,7	2
IC UA 78L12 regulator	U8	1
IC 74LS245	U9,15	2
IC 74LS157N	U10,11	2
IC TMS4416-20 (200nS) MOS dynamic RAM	U12,13,17,18	4
IC AY-3-8912 sound generator and I/O port	U14	1
IC 23128 mask ROM (16K x 8)	U16	1
IC Z80A cpu	U19	1
IC 2364 mask ROM (8K x 8)	U20	1
IC 74LS00	U21	1
trans. pnp D43C1	Q1	1
trans. pnp 2N2907	Q3	1
trans. pnp 2N3904	Q7,8	2
trans. pnp 2N2222	Q5,4,2	3

QZX FRIENDS

WA1VQQ -- Mike was the first to express interest in a book of back issue articles. He uses a T/S 1000.

K7JGR -- Ed says he would like to see some articles about programming for AMTOR even if the programs were not completely successful. He liked the articles on machine language and FIDO.

HP1AC -- Cam says he is enjoying his Timex 1000 with TI99-4/a keyboard and

2040 printer. He is using RTTY with the NRAP (NU4V) program and interface with the WB2BWJ state of the art tuning unit. He has worked 44/32 countries.

W3NIJ -- Zeke is a retired EE and very interested in computers. He has a T/S 1000, 1500, and 2068. Also a modem and printer. He has always been interested in electronics, amateur radio, and the design of electronic equipment. He hopes to get a QL soon.

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: Timex Sinclair 2040 personal printer paper for 3 roll packs at $1.50, 4 roll packs by Labelon for $2.00, please include $2.00 for UPS shipping. Send to Dale Johnson WB9NRK, 1331 Bellevue Lot 371, Green Bay, Wis. 54302.

FOR SALE: NEW BOOK: "30 MUSIC PROGRAMS FOR TS 2068." A very nice selection of universally admired musical compositions. Good use of BEEP and SOUND commands. Spiral bound, 140 pages. Send $8.00 + $1.00 s/h to the publisher: Electret Scientific Co., P.O. Box 4132, Star City, WV 26505.

73, W4GHV & K5XY

QZX presents the best software & hardware projects available for the radio amateur. While the contents are believed to be accurate, no warranty is extended on any program or project. No investigation has been made of the claims or reputation of any advertiser. It would be greatly appreciated if all correspondance requiring an answer would be accompanied by a self-addressed stamped envelope (SASE). Copyright by QZX, 1984. All rights reserved, photocopying by permission only.

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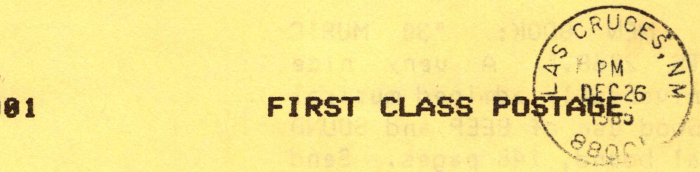
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